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VASCULAR DISEASE

PULMONARY ARTERY STIFFNESS IS INDEPENDENTLY ASSOCIATED WITH THE DEGREE OF RIGHT VENTRICULAR DYSFUNCTION IN PULMONARY HYPERTENSION

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Background: Pulmonary artery (PA) pressures are directly correlated to right ventricular (RV) dysfunction in pulmonary hypertension (PH). We hypothesized that PA stiffness may influence RV ejection fraction (RVEF) or RV mass index (RVMI) beyond the degree of PA pressure.

Methods: Right heart catheterization and cardiac magnetic resonance (CMR) were performed within one week in 124 patients [86 women, age 54.9 ±15.6 years] with known or suspected PH. CMR was used to measure RVEF, RVMI, relative PA cross-sectional area change (elasticity) and the area for a given change in PA pressure (distensibility).

Results: Using Spearman correlation, PA elasticity and distensibility were significantly associated with RVMI and RVEF (Figure, p-values<0.001). Using multivariate regression analysis, elasticity was independently associated with RVMI and RVEF, respectively, after adjusting for age, gender, ethnicity, and mPAP (β = -0.002, p=0.046 or β = 0.26, p= 0.002) or pulmonary vascular resistance index (PVRI; β = -0.003, p=0.003 or β = 0.29, p<0.001). Distensibility was independently associated with RVMI and RVEF, respectively, after adjusting for age, gender, and ethnicity, but remained significant only after further adjustment for PVRI (β = -0.025, p=0.032 or β = 3.0, p=0.004) and not mPAP.

Conclusion: Measures of PA stiffness are associated with RVMI and RVEF independent of the degree of PH. These findings suggest that the loss of PA elasticity may be an important determinant of RV hypertrophy and function in PH.